

WHAT IS CLAIMED IS:

1 1. An apparatus for inducing seismic energy in a formation penetrated by a borehole,
2 comprising:
3 – an anchor device engaged with the borehole at a selected location; and
4 – a vibratory source at a surface location coupled to the anchor causing the anchor to
5 impart seismic energy into the formation.

1 2. The apparatus of claim 1 further comprising a power source to drive the vibratory source.

1 3. The apparatus of claim 1, wherein the power source is selected from a group consisting of
2 (i) a hydraulic unit; (ii) an electrically-operated device; and (iii) a pneumatic device.

1 4. The apparatus according to claim 1 further comprising at least one sensor to provide a
2 measure of a parameter of interest.

1 5. The apparatus of claim 4, wherein the parameter of interest is one of (i) motion of the
2 anchor; (ii) load on the anchor; (iii) load on a tubular string coupled between the anchor and the
3 vibratory source; and (iv) motion of the tubular string.

1 6. The apparatus of claim 1 further comprising:

2 – a first sensor proximate the anchor to measure a selected parameter of interest; and
3 – a second sensor spaced-apart from the first sensor measuring the parameter of interest to
4 determine transmissibility of power from the vibratory source to the anchor.

1 7. The apparatus of claim 6, wherein the parameter of interest is one of (i) motion of the
2 anchor; (ii) load on the anchor; (iii) load on a tubular string coupled between the anchor and the
3 vibratory source; and (iv) motion of the tubular string.

1 8. The apparatus of claim 5 further comprising a control unit to control the operation of the
2 vibratory source.

1 9. The apparatus of claim 8, wherein the control unit includes a computer.

1 10. The apparatus of claim 8, wherein the control unit controls frequency of operation of the
2 vibratory source in response to the sensed parameter of interest.

1 11. The apparatus of claim 10, wherein the control unit controls frequency in accordance
2 with programmed instructions provided to the control unit.

1 12. A system for obtaining seismic data, comprising:

2 – an anchor device engaged with the borehole at a selected location; and
3 – a vibratory source at a surface location coupled to the anchor causing the anchor to
4 induce seismic energy into the formation.
5 – at least one detector placed spaced-apart from the anchor, to detect seismic signals
6 responsive to the seismic energy imparted in the formation by the anchor.

1 13. The system of claim 12 further comprising a control unit to control the vibratory source.

1 14. The system of claim 13, wherein the control unit controls the vibratory source in response
2 to the signals detected by the at least one detector.

1 15. The system of claim 12, wherein the at least one detector is placed at a location selected
2 from one of (i) surface location; (ii) a location in the borehole; (iii) a secondary borehole formed
3 spaced-apart from the borehole; or (iv) a secondary borehole that forms a part of a multibore
4 system containing the borehole.

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16. The system of claim 12, wherein the at least one detector includes a plurality of spaced-apart detectors.

17. The system of claim 12, wherein said control unit processes the signals detected by at least one detector.

18. A method for inducing seismic energy in a formation penetrated by a borehole,
2 comprising:

- 3 - coupling a tubular string between a downhole anchor and a surface vibratory source;
- 4 - vibrating the tubular string to generate a seismic wave in the formation at the anchor.

1 19. The method of claim 18 further comprising for providing at least one sensor measuring a
2 parameter of interest, wherein the parameter of interest is one of (i) load on the anchor; (ii) load

- 3 on the tubular string proximate the vibratory source; (iii) vibratory motion of the anchor; or (iv)
4 vibratory motion of the tubular string proximate the vibratory source.

1 20. The method of claim 19 further comprising controlling the frequency of operation of the
2 vibratory source with a control unit, said control unit having a processor acting according to
3 programmed instructions, said control unit controlling the frequency of the vibratory source in
4 response to the sensed parameter of interest.

1 21. The method of claim 17 further comprising providing a first sensor proximate the anchor
2 to measure a selected parameter of interest and a second sensor spaced-apart from the first
3 sensor, said second sensor measuring the same parameter of interest for determining
4 transmissibility of power from the vibratory source to the anchor.

1 22. The method of claim 21, wherein the parameter of interest is one of (i) motion of the
2 anchor; (ii) load on the anchor; (iii) load on a tubular string coupled between the anchor and the
3 vibratory source; and (iv) motion of the tubular string.

1 23. A method for obtaining seismic data, comprising:
2 – engaging an anchor in a wellbore in a subsurface formation at a selected downhole
3 location;
4 – coupling the anchor to a surface located vibratory source;
5 – energizing the vibratory source to impart seismic energy through the anchor to the
6 formation; and

- 7 – sensing the seismic energy by at least one detector spaced-apart from the anchor.

1 24. The method of claim 23, further comprising controlling the vibratory source with a
2 control unit.

1 25. The method of claim 23, further comprising controlling the vibratory source with a
2 control unit in response to the signals sensed by the at least one detector.

1 26. The method of claim 23, wherein the at least one detector is placed at a location selected
2 from one of (i) surface location; (ii) a location in the borehole; (iii) a secondary borehole formed
3 spaced-apart from the borehole; or (iv) a secondary borehole that forms a part of a multibore
4 system containing the borehole.